



# How attitude strength biases information processing and evaluation on the web



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## ABSTRACT

In this study we examined the influence of attitude strength on the processing and evaluation of sources and information on the Web. Seventy-nine German university students participated in an eye-tracking study in which they read information from eight pre-selected websites from different sources on the controversial topic of organic foods. Results showed that participants who felt strongly about the topic (i.e., those with strong prior attitude strength) scrutinized website logos of attitude-inconsistent websites shorter and judged the credibility of attitude-inconsistent websites lower. They also included more attitude-consistent information in an essay task than participants with weaker prior attitudes. Participants who felt less strongly about the topic (i.e., those with weaker prior attitudes) fixated longer on text from attitude-inconsistent websites than from attitude-consistent websites. By contrast, for participants with strong prior attitudes the time spent on the texts from attitude-consistent websites and attitude-inconsistent websites did not differ significantly. The results show that prior attitudes can bias evaluation and processing of information in different ways. Even though participants were not fully biased during initial information processing, they were so when evaluating the information and presenting it in an essay task.

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## 1. Introduction

In today's society, the Internet is an important source of information for those who want to know more about all kinds of topics (Kienhues, Stadler, & Bromme, 2011; Rouet, 2006). Browsing the web for information in order to solve information-based problems is a complex skill that requires a number of subskills (Brand-Gruwel, Wopereis, & Walraven, 2009). Searchers need to find sources that may contain relevant information and have to scan selected websites in order to achieve an overall impression of the source and to judge its relevance. When deemed relevant, the information is subjected to further processing. In this stage, the aim is to gain a deep understanding of the information and to integrate pieces of information found across sites. Once all relevant

information has been processed, the final step is to synthesize it and to organize and present it, for example in an essay or a presentation (Brand-Gruwel et al., 2009).

Throughout this process, evaluation behavior is of critical importance (Brand-Gruwel et al., 2009), as the fact that anybody can publish freely on the Internet, without review by professional gatekeepers, leads to considerable quality differences of information found online. The need for critical evaluation is particularly true for controversial socio-scientific topics, for which there is no clear-cut answer or for which there is a large amount of disagreement across sources (Bråten, Strømsø, & Salmerón, 2011). The challenge is to engage in source evaluation. This concerns the process of attending to and evaluating the source of a website (Bråten, Britt, Strømsø, & Rouet, 2011) in order to distinguish reliable websites from less reliable ones (Mason, Boldrin, & Ariasi, 2010; Wopereis, Brand-Gruwel, & Vermetten, 2008). When evaluating online sources, attention should not only be directed at the content presented in the website, but also at the available information about the credibility of the source providing the content, such as the expertise and potential vested interests of the

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information provider (Bråten, Strømsø, & Britt, 2009; Kammerer & Gerjets, 2012; Mason et al., 2010).

However, research has shown that source evaluation is a challenging task and that source information is not always attended to spontaneously when reading multiple printed or online documents as indicated for instance by eye-tracking data or verbal protocols (e.g., Britt & Aglinskas, 2002; Gerjets, Kammerer, & Werner, 2011; Metzger, Flanagin, & Zwarun, 2003; Walraven, Brand-Gruwel, & Boshuizen, 2009; Wiley et al., 2009). In addition, students' evaluation behavior may be influenced by their prior attitudes, i.e., their evaluative judgments about issues (Crano & Prislin, 2006). Information processing can be biased towards people's prior attitudes, as people typically are more favorable towards information that supports their attitudes than information that challenges these (Hart et al., 2009). This is particularly true when people feel very strongly about their attitudes (Taber & Lodge, 2006).

### 1.1. Prior attitudes and the processing and evaluation of information

Prior attitudes can affect information processing and evaluation in profound ways. For instance, people are almost two times more likely to select information that supports their prior attitudes (Hart et al., 2009). Studies on Internet-based tasks have shown that people typically allocate more attention to information that is consistent with their prior attitudes as measured by reading time data (Graf & Aday, 2008; Knobloch-Westerwick & Meng, 2011), and they also attend to such information first before considering attitude-inconsistent information (Graf & Aday, 2008). Similarly, in a study by Brannon, Tagler, and Eagly (2007) participants holding strong attitudes expressed more desire to view attitude-consistent information (i.e., article titles) than attitude-inconsistent information. Such preference for attitude-consistent information is called a confirmation bias (Nickerson, 1998). At the same time, when readers holding strong attitudes are confronted with attitude-inconsistent information also a disconfirmation bias can occur; i.e. they try to challenge and discredit this attitude-inconsistent information and thus scrutinize it more (Taber & Lodge, 2006). In this vein, for instance, Edwards and Smith (1996) found that attitude-inconsistent arguments were scrutinized longer than attitude-consistent arguments in an argument evaluation task.

In an influential study on the effects of prior attitudes on evaluation of information, Lord, Ross, and Lepper (1979) presented undergraduate students with the results of a study showing the deterrent effects of the death penalty on crime rates, and a study showing no such effects. Participants rated the study that supported their own prior attitudes to be of higher quality and more convincing than the study that presented attitude-inconsistent outcomes. A more recent study by Kobayashi (2010) also showed that participants generally were more critical of attitude-inconsistent arguments, whereas they were more supportive of arguments that were in line with their prior attitudes. Edwards and Smith (1996) corroborated the finding that attitude-inconsistent arguments are judged to be weaker (though they were scrutinized longer than attitude-consistent arguments). They also found that especially participants who were emotionally attached to the topic when being presented with attitude-inconsistent arguments generated more refutational arguments in a thought-listing task than when being presented with attitude-consistent arguments. Similarly, Taber and Lodge (2006) found prior attitude biases in the evaluation of arguments for those who hold very strong attitudes toward the controversial topics under investigation. Those holding weak attitudes, on the other hand, showed little or no bias when evaluating pro and con arguments. This may be explained by the fact that these people have less motivation to challenge attitude-

inconsistent information (Taber & Lodge, 2006).

Studies in the field of multiple-text comprehension have revealed biases due to learners' prior attitudes (or specifically, their attitude strength) in the presentation of information in essay tasks. Van Strien, Brand-Gruwel, and Boshuizen (2014) found that 11th grade students with stronger attitudes drew one-sided conclusions after reading multiple texts presenting conflicting information on the relationship between violent videogames and aggression. Whereas students with weak attitudes tended to write essays expressing the inconclusive nature of the debate, students with strong prior attitudes more often took a stance in line with their prior attitudes. These students also used less information from the reading materials in their essays, but rather included a considerable number of attitude-consistent arguments they formulated themselves. A similar finding was shown in a study by Maier and Richter (2013), who demonstrated that readers' situation models of a controversial topic are biased towards texts presenting attitude-consistent information.

In sum, prior attitudes and the strength of these attitudes can play a role throughout the information problem solving process. They can influence which information will be selected, how this information will be evaluated, and which information will be presented in essays. However, to date, little is known about how prior attitudes affect evaluation of source information, i.e. not the evaluation of the content itself but the sources that provide this content. A recent study by Bråten, Salmerón, and Strømsø (2015) indicated that readers better remembered source information after having read a text that contradicted (as compared to confirmed) their personal beliefs about the topic (i.e., what individuals accept as or want to be true about a particular topic). Similarly, Braasch, Bråten, Britt, Steffens, and Strømsø (2014) found that the strength of readers' topic beliefs was positively associated with memory for source information when they read claims of weak evidence or poor argumentation (as compared to claims of strong evidence and argumentation). As people displaying a disconfirmation bias have a tendency to be more critical towards information that does not support their prior attitudes, it is well possible that people with strong prior attitudes will consider such attitude-inconsistent information to be weaker than attitude-consistent information. As a consequence, attention to source information should increase.

### 1.2. The present study

As outlined above, there is a wide body of research describing the biasing effects of prior attitudes on information processing from multiple sources. However, few studies in the field of educational psychology to date have directly examined the association between prior attitudes or attitude strength, respectively, and source evaluation. The present study sought to examine how attitude strength influences the processing, evaluation, and use of partly attitude-inconsistent information from multiple websites stemming from different types of sources, thus, also focusing on source evaluation. To explore these relationships we used a rich multimethod approach that included eye-tracking data, website credibility ratings, and the use of arguments in an essay task. By also including eye-tracking data, which reflect visual attention allocation and moment-to-moment cognitive processing (cf. Rayner, 1998), we sought to provide additional information about how long searchers attend to textual as well as source information on the web pages.

In particular, our hypotheses were as follows:

With respect to the processing of information, we expected that participants with a high attitude strength would display a disconfirmation bias (cf. Edwards & Smith, 1996; Taber & Lodge, 2006), as evidenced by longer total fixation times on attitude-inconsistent texts than on attitude-consistent texts (Hypothesis 1).

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